

Power to the Edge

The Future of C2: Agility, Focus and Convergence

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The Future of C2

The future is not necessarily a linear extension of what we are doing now.

To understand what capabilities are needed and whether we are on the right track or need to change course we need to answer the following:

- What is the critical capability for the 21st Century?
- What are the implications for Command and Control?

21st Century Missions

1. Missions cannot be adequately predicted
2. Ignoring the complexity of the environment.
3. Adversaries exploit strengths

**The Appropriate Response
is Agility**

and broader effects spaces are
less.

Agility

- 21st Century Security Challenges characterized by huge amounts of uncertainty and risk
- Agility is the answer to uncertainty and risk

Robust - effective across a range of conditions;

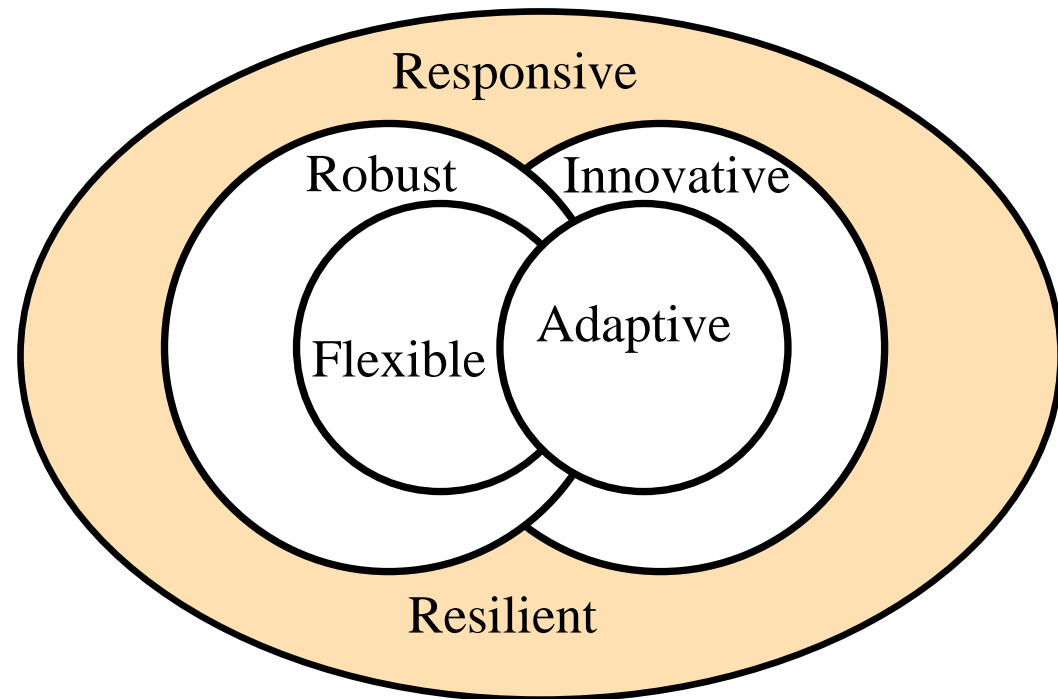
Resilient – able to function / degrade gracefully / reconstitute when damaged

Responsive - speed of recognition and action;

Flexible - multiple ways to succeed, seamless shifting;

Innovative – learning and solving

Adaptive – alteration in C2 organization and process.



Agenda

- What is the critical capability for the 21st Century?
- What are the Command and Control implications of 21st Century missions and the need for agility?

Command and Control Implications

- What approaches to C2 are most appropriate?
- What organizational forms are the most appropriate?
- What are the implications for recruiting, education and training?
- What performance characteristics should drive the design and development of systems?

Problem

Command and Control terminology and connotations
are constraining the search for answers.

Constraining Assumptions

- Without commanders there is no *Command and Control*
- Unity of command is the *sine qua non* of *Command and Control*
- Centralized Command, Decentralized Control
- There are Strategic, Operational and Tactical levels
- There must be a Headquarters supported by a large staff
- Information flows follow the chain of command

Question?

If we “violate” these assumptions
are we taking about *Command and Control*?

Too many people and organizations think not!

The Case for a New Vocabulary

- The ‘official’ definitions and, more importantly, significant numbers of people think that Command and Control equates to “how” it has been traditionally approached.
- 21st Century mission challenges require new approaches to accomplishing the functions we associated with *Command and Control*
- But – the language of *Command and Control* is hard-wired with traditional concepts and practices.
- Efforts, dating back more than a decade, to re-define *Command and Control* in terms of “what” functions need to be accomplished while leaving the “how” open, have only been marginally successful.
- There is an urgent need for new approaches to C2; waiting is not an option.

What are we trying to accomplish
with *Command and Control*?

Communicating Ideas

- How can we best communicate what are we trying to accomplish with *Command and Control*?
 - with jargon and acronyms?
 - or
 - with everyday language?

Focus and Convergence
with Agility

Focus

embodies the essence of what command is designed to accomplish without the baggage.

Convergence

embodies the essence of what control hopes to accomplish without self-delusion.

Focus

- **Focus** has the following common meanings:
 - a state or condition permitting clear perception and understanding
 - a center of activity or attention
 - directed attention, and
 - a point of convergence
- **Focus** works well with key concepts
 - e.g. Intent, awareness
- **Focus** has instantiations in all of the domains
 - physical, information, cognitive, and social

Achieving Focus does not require someone in charge

Convergence

- **Convergence** has the following common meanings:
 - moving toward union or uniformity
 - coordinated movement to a single point
 - independent development of similar characters
 - merging of distinct technologies, industries, or devices into a unified whole
- **Convergence** works well with **Focus** and key concepts
 - e.g. shared intent, shared awareness, self-synchronization
- **Convergence** connotes a journey toward a definable outcome.
- **Convergence** has instantiations in all of the domains
 - physical, information, cognitive, and social

Convergence does not require control

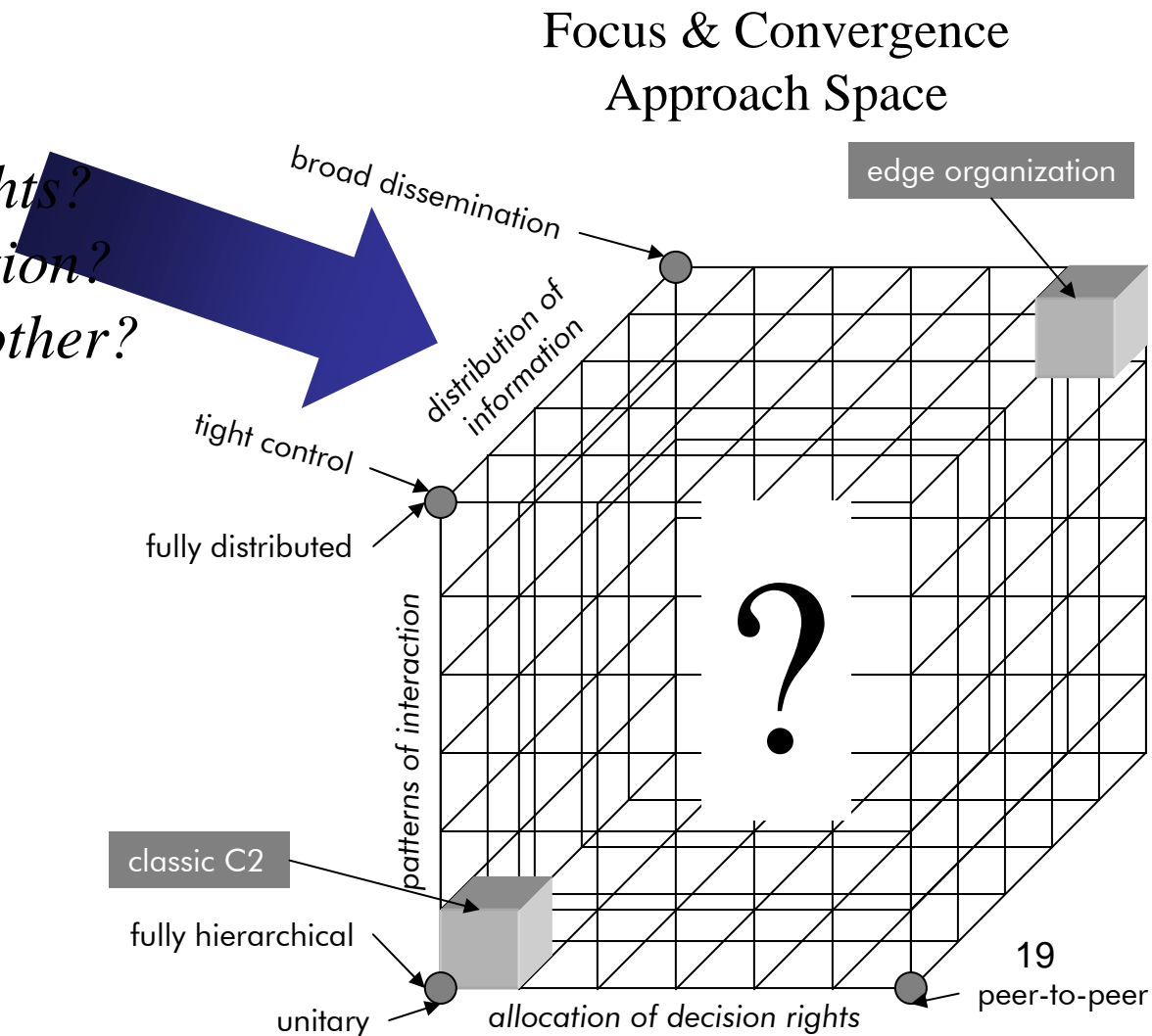
Focus & Convergence

- Focus & Convergence implies the existence of a set of relationships and interactions among participants in an endeavor.
- This, the F&C Approach Space is isomorphic to the C2 Approach Space.
- Traditional approaches to C2 can, in certain situations and circumstances, achieve adequate Focus & Convergence.
- Achieving Focus makes it more likely than Convergence can be achieved
- Achieving Focus & Convergence does not guarantee mission success. However, failing to achieve an adequate level of F&C dramatically reduces the likelihood of success.

Choosing an approach to achieve Focus and Convergence with the requisite agility

*For a given situation,
How do the participants*

- allocate decision rights?*
- disseminate information?*
- interact with one another?*



Are *Network-Centric* concepts and capabilities
and
Power to the Edge principles still as important?

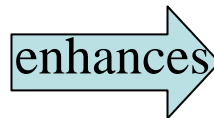
The Network-Centric Tenets

A robustly networked force



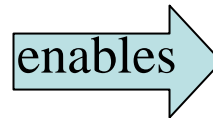
Information Sharing

*Information Sharing
and
Collaboration*



*Quality of information
and
Shared Situational Awareness*

Shared situational awareness



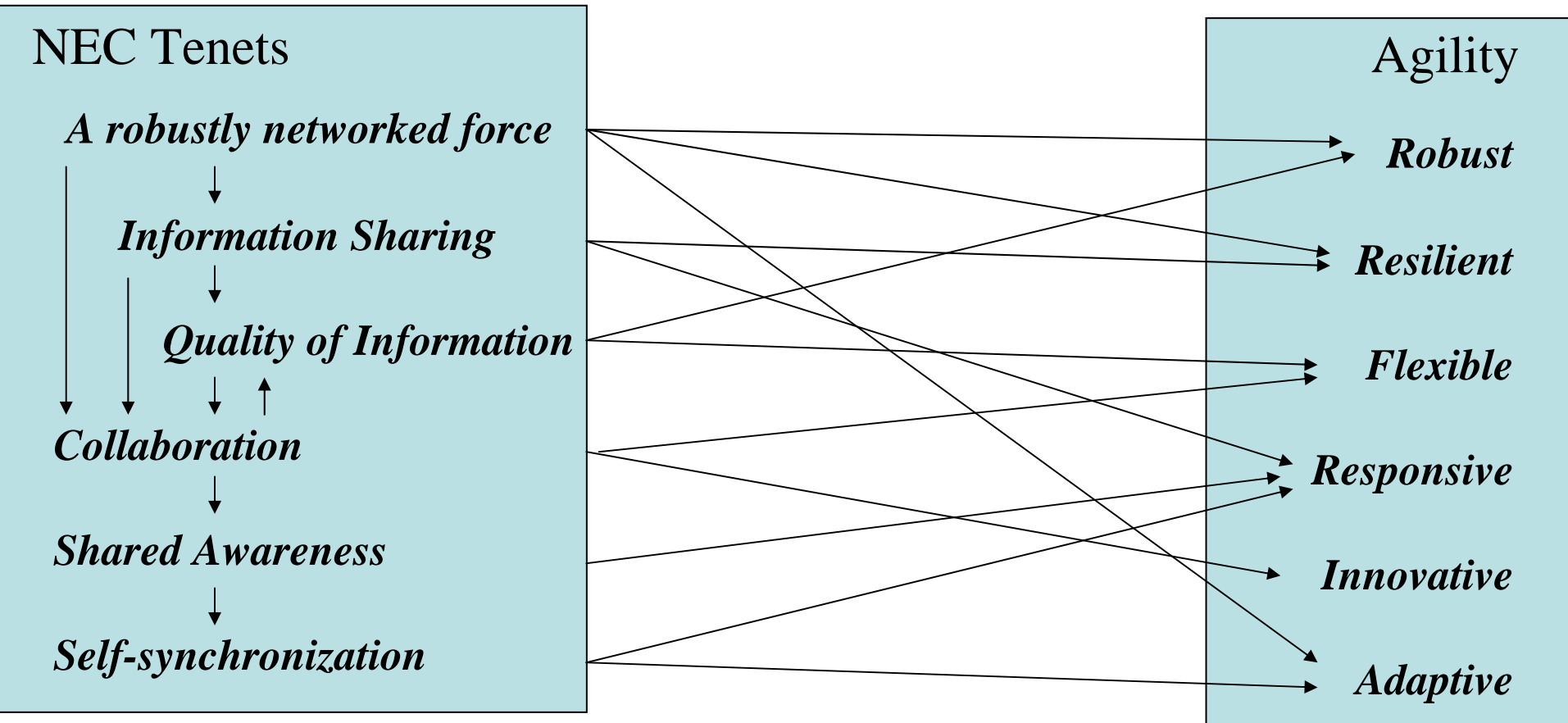
*Collaboration
and
Self-synchronization*



These, in turn, dramatically increase *mission effectiveness*

NEC and Agility

partial set of relationships



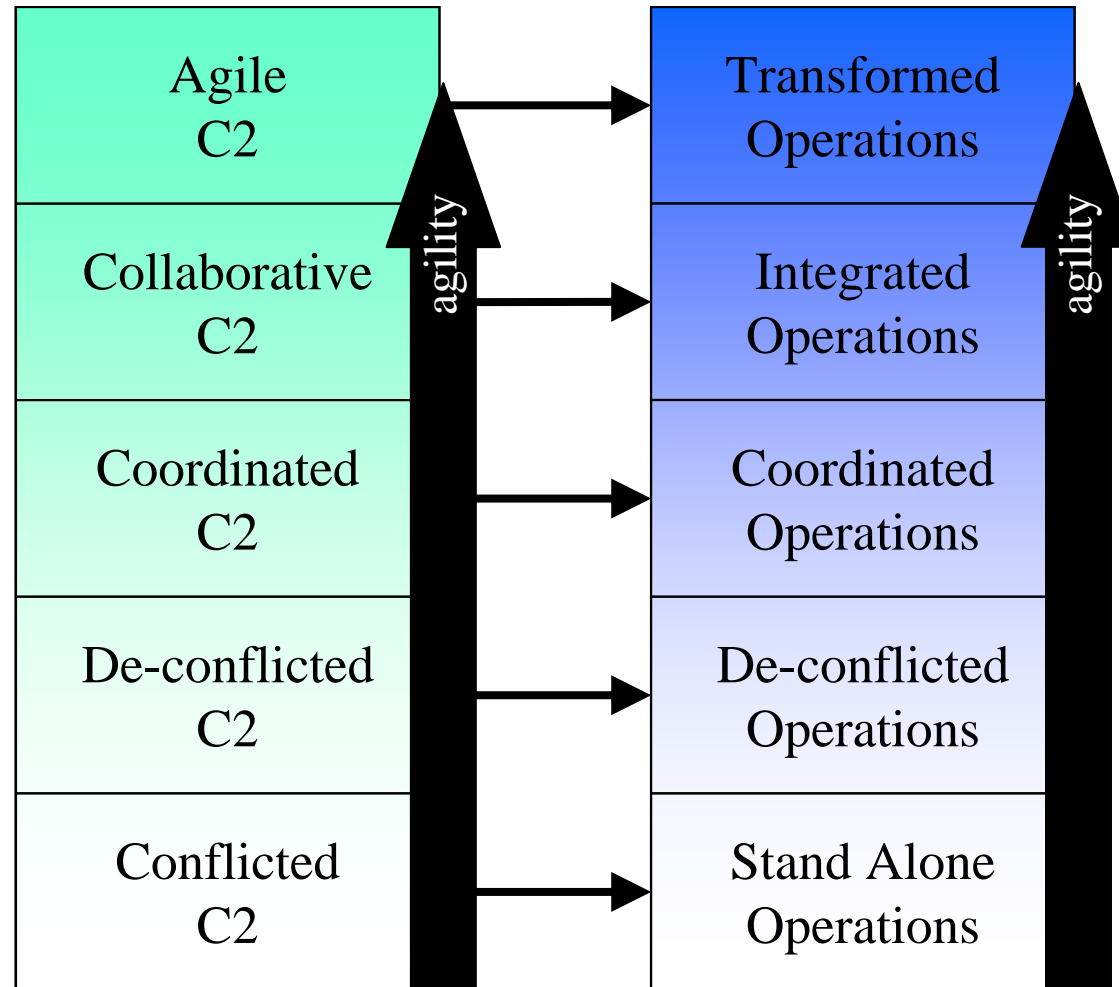
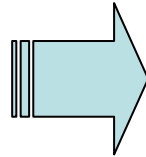
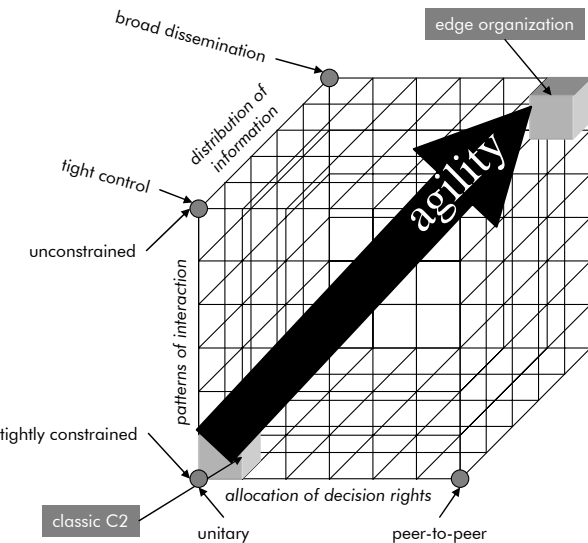
NEC contributes in many ways

Power to the Edge Principles

- Distribute responsibilities to the edges, maximizing opportunities to be responsive and innovative.
- Key participants move to the edge(s).
- Ensure that needed information is broadly accessible giving all participants the power to shape their information positions.
- Facilitate a rich set of interactions between and among the participants increasing variety.
- Awareness including Intent needs to be broadly shared (overlap not identical).
- Dynamically change approach to F&C in response to the situation.

PTTE → F&C Maturity → Agility

Focus & Convergence Approach Space



Critical Path Research Challenges

- Metrics: Focus, Convergence, Agility
- How much agility is required?
- Exploring the F&C Approach Space
- Leadership in edge organizations
- Understanding and establishing trust in a network-centric environment
- Living in a “pull” environment
- Getting to Shared Awareness
- Convergence as an emergent property
- Collaborative processes